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The Innovators

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... this issue of *The Innovators*, we focus on John Saringer, President of Toronto Medical Corp., Scarborough, Ontario. This young and growing business manufactures machines for post-surgery care. These machines provide "continuous passive motion" (or CPM) for elbows, shoulders, fingers and the lower limbs. The concept of CPM was first conceived and developed by Dr. Robert Salter of The Hospital for Sick Children in Toronto.

MEDICAL CHALLENGE:

Questioning traditional practice

As a medical student, Dr. Robert Salter sustained torn ligaments in both ankles as a result of a football injury. Since he wanted to continue to play for the team, he treated his own injury, not by plaster casts and rest, but by simply taping the damaged limbs. Contrary to traditional medical procedure, Salter believed that joints were meant to be moved when damaged, not to be immobilized in plaster casts.

Salter's injury healed quickly... more quickly than if he had used the conventional treatment. As a result of this personal experience, he hypothesized that motion—not immobility—is better for healing joints. His research on animals, over a number of years, demonstrated the harmful effects of immobilization, and in 1969 Salter conceived a new concept, continuous passive motion. He has been studying its effects on animal joints ever since.

THE TESTING STAGE:

Motion proves effective

Salter experimented with three groups of rabbits that had surgical defects in their knee cartilage. The first group was treated by plaster casts (immobilization); the second group was caged (intermittent motion); and the remaining group was placed in a machine he had designed to move the joint slowly and continuously (continuous passive motion).

The results confirmed Salter's earlier suspicions: there was a strong correlation between motion and healing. The rabbits treated by casts fared the worst. None, when examined six months later, had formed new cartilage. In fact, the joints deteriorated and many signs of arthritis were evident. The rabbits left hopping in their cages fared somewhat better. They too had signs of arthritis, but 20 percent had formed new cartilage.

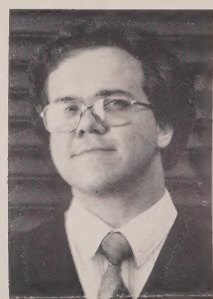
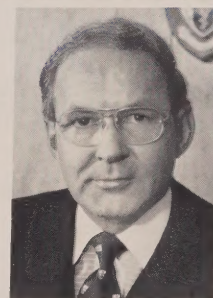
The rabbits treated by continuous passive motion, however, had significantly fewer signs of degenerative arthritis, and 80 percent of them had developed new cartilage. Subsequently, Salter and his colleagues have studied the effects of CPM in many different experimental models.

COMMERCIALIZATION:

From concept to reality

After nine years of research and certain of the value of continuous passive motion, Salter asked Professor David James at the University of Toronto's Department of Mechanical Engineering to build a device that would provide continuous passive motion for the knee joint. James turned the project over to his bright young research assistant, John Saringer.

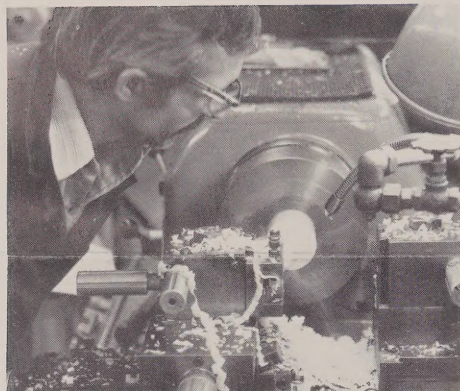
Saringer began designing a CPM machine that would move a joint through one complete cycle of its natural range of motion every 45 seconds. The device was used successfully on a 16 year-old-girl whose knee joint had been



(top) Dr. R.B. Salter,
developer of CPM
(bottom) J.H. Saringer,
President, Toronto Medical
Corp., manufacturer of
CPM machines



“It’s in my nature, however, that once I start something, I have to follow it through to the finished product.” —John Saringer



Vasile Prodan, a Toronto Medical employee, manufacturing CPM machine parts

rendered virtually useless from a previous injury. Dr. Salter operated. Before the anaesthetic wore off, he placed her leg in the CPM machine. She awoke to see her knee bending and flexing, with absolutely no pain. The knee is now completely normal.

Saringer and James, excited by the success of the leg machine, and wanting to keep Salter’s concept in Canada, turned the project into a business venture. They started a small company, “S and J Engineering,” and began building prototypes for elbow, shoulder and finger CPM machines.

Dr. Salter became Professor and Head of Orthopaedic Surgery at the University of Toronto. In addition, he is Senior Orthopaedic Surgeon at The Hospital for Sick Children, and has earned international acclaim for a number of innovations including Continuous Passive Motion. Companies in France, California and elsewhere, began manufacturing CPM machines, based on Salter’s theory. However, according to Salter, “The concept of continuous passive motion was discovered in Canada. It is only fitting that a Canadian company should follow it through to production.”

With few funds to finance their research and development, however, S & J Engineering soon ran short of working capital. After applying for assistance from a number of sources, the company received a \$200,000 grant from the Imasco/CDC Research Foundation that enabled them to complete development of the elbow, shoulder and finger machines and obtain patents. In 1981, S & J found a distributor to sell its products.

The next year, Saringer left the University of Toronto to devote his complete attention to the company. At this point, he decided to focus the business on the manufacture of CPM machines. Saringer bought out James, and renamed the company Toronto Medical Corp.

IDEA’S CONTRIBUTION:

Meeting financial needs

Saringer soon discovered that the lower-limb CPM machine was the most in demand. To complete the design and production of a non-portable unit for this purpose, additional financial resources were required.

According to Saringer, “It would have been an easy thing for us to license our products to firms in the United States. It’s in my nature, however, that once I start something, I have to follow it through to the finished product.”

When Saringer was at the University of Toronto, he heard from his colleagues about the formation of IDEA Corporation. He approached IDEA for financial assistance to put the new lower-limb device into production.

As an investment, IDEA saw a number of benefits in Toronto Medical Corp.

- There could be a high financial return to investors.
- The founder of the CPM concept, Salter, openly endorses the design and has worked with Saringer to perfect the machines.

■ There is a broad market for the product — customers include orthopaedic surgeons and hospitals, with expected market expansion to include physiotherapists and home care.

■ The retail price is considerably lower than major competitors in the U.S.

■ Toronto Medical is the only company in Canada manufacturing CPM machines. An investment by IDEA would help an innovative small business remain in Canada and foster a major domestic presence in the market.

■ Distribution channels for the product are established already.

■ Key personnel includes D. Douglas Davidson, a key link to international distribution channels, with more than 20 years' experience in the medical products market.

■ A relationship between Toronto Medical Corp. and IDEA could develop further with new medical technologies licensed by IDEA and manufactured by Toronto Medical.

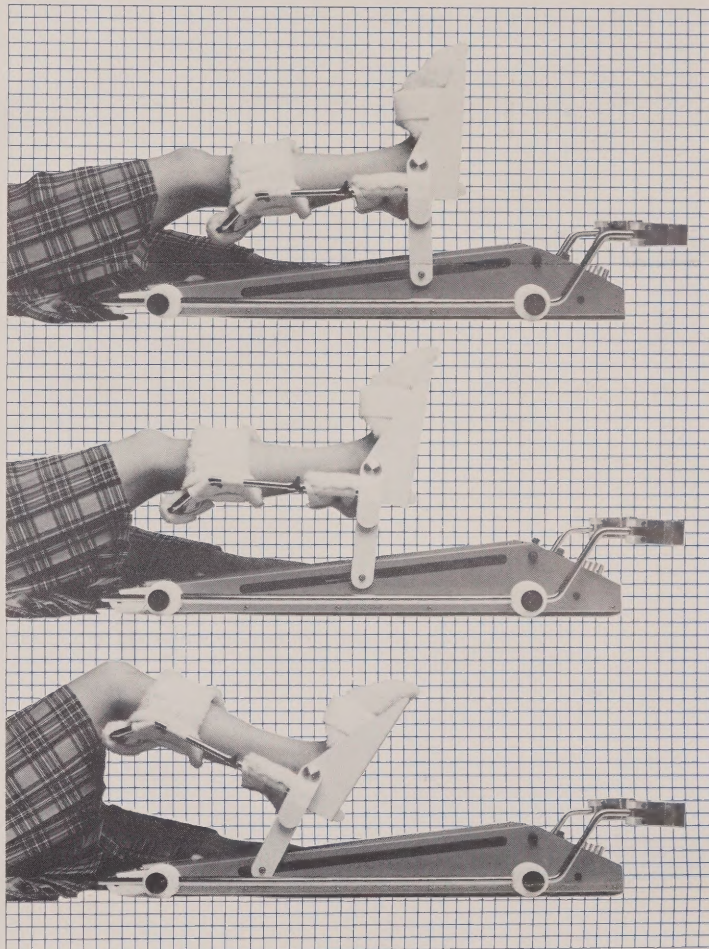
After a full review, IDEA now has invested \$480,000 in Toronto Medical Corp. IDEA's Chairman, H. Ian Macdonald, says: "Our investment not only assists this small business and creates jobs in Ontario, but could benefit the thousands of people who'll use Toronto Medical's products."

A LOOK AHEAD:

Plans for expansion

The future looks bright for Saringer and Toronto Medical. Production of the lower-limb machine is now being financed; there are ten employees on staff, with plans to expand as sales grow.

Sales of the finger, shoulder and elbow machines continue to increase, and with the lower-limb machine expected to produce 85 percent of the profits, John Saringer is working 70 hours a week — and loving it. In medical terms, you might say that Saringer is in continuous active motion. ▼



Prototype of lower-limb machine demonstrating leg in continuous passive motion

IDEA announces program to aid commerce on campus

IDEA Corporation announced a new \$3-million program on August 27, 1984, to help Ontario's universities put their research into commercial and industrial use.

One million dollars a year has been set aside, for the next three years, to help Ontario's universities identify commercially significant technologies. In many cases, IDEA's financial assistance will be used to support the activities of an individual, employed on a staff or contract basis by the university, to search out new research developments that show commercial promise.

Separate agreements are to be negotiated with universities, either singly or in groups. At some universities, which already employ such Commercial Development Officers, IDEA's financial contributions may be used by the universities to enhance their budgets for commercializing research.

IDEA's Chairman, H. Ian Macdonald, says: "IDEA has a vital role to play in bringing together universities and business. There is no question in my mind that partnerships between these two sectors will be instrumental in developing Canada's technological competitiveness.

"The quality of Canadian research is generally high. But not enough attention is being given to the commercial use of the new developments emerging from this research. What Canadian industry and investors need are mechanisms, on campus, that will uncover research projects with potential commercial merit.

"Clearly, the needs of the industrialist must combine with the capabilities of the researcher," Macdonald added. "The Commercial Development Officers program is one way that IDEA is contributing to the process."

Promising new technologies, uncovered through this program, will be presented to IDEA for consideration, and IDEA may choose to invest in the early stages of pre-commercial development, or assist in licensing. Proposals also may be directed to other potential investors and industrial sponsors, as appropriate.



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